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火力发电企业在用天然气管道
安全性评价与研究

**Safety Assessment and Research of the Thermal Power
Generation Enterprise in the Pipeline**

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摘 要

由于历史原因,大部分火力发电企业的压力管道在施工及使用过程中均没有有效的监管和检验,有些管道都有可能“带病”运行,严重威胁了企业的生产安全和电网稳定。因此,摸清火力发电企业在用压力管道的实际安全状况,对企业、社会都有着重要意义。

本文以福建某火力发电企业在用天然气管道为研究对象,探索在不停机及短暂停机状态下选择合适的检测技术快速准确的查出安全隐患,同时对含超标缺陷的管道进行安全性评价,以帮助企业在不影响正常生产、保障电网稳定的前提下根据缺陷危害程度合理安排检修时间,并帮助企业建立完备的压力管道安全技术档案,将其纳入政府有效监管范围内。

本文的主要研究工作包括管道资料的收集及审查、管道轴测图绘制、宏观检验、管道壁厚测定及缺陷原因分析、埋地管道检验的研究、无损检测方法的选择及缺陷原因分析、相控阵检测及缺陷原因分析、超声导波检测的研究、光谱分析、含超标缺陷管道的安全评定和管道安全状况等级综合评定等内容,主要创新之处有:

(1) 本文研究并验证了各种常规检测方法的优缺点,优化了检测技术,并在省内率先使用了超声导波和相控阵检测技术,并将其作为常规检测技术的补充,有效的以防止了缺陷的漏检或错检。

(2) 本文在省内电力行业率先采用许可流变应力比法和 U 因子法对按照《在用工业管道定期检验规程》定为 4 级的含超标缺陷管道进行安全评定计算,判别缺陷的危害程度,为用户合理安排检修周期提供了有力技术支持。

最后在现场评价工作结束后,通过对该管道运行状况进行定期的跟踪、复查,验证了研究所选择检测方法及计算方法的准确性,也证明管道安全性评价结果是安全的、可靠的,是能够保证设备安全运行的。同时,本次研究所形成的关于火力发电企业在用天然气管道安全性评价的流程及方法对今后开展火力发电企业在用压力管道安全性评价或检验工作提供借鉴和参考。

关键词: 火力发电; 天然气管道; 安全性评价

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Abstract

Due to historical reasons, most of the thermal power enterprises pressure pipeline in the construction and use of the process are not effective supervision and inspection, some of the pipes are likely to run "sick", a serious threat to the enterprise production safety and stability of power grid. Therefore, it is important to find out the actual safety situation of the thermal power enterprises in the use of the pressure pipe, and to the enterprise and the society.

In this paper, a thermal power plant in Fujian province is selected as the research object, which is used to select the appropriate detection technology to detect the safety hazards, and to help the enterprises to establish a complete pressure pipeline safety technical file without affecting the normal production and ensure the stability of the network.

The main research work of this paper includes the collection and examination of pipeline data, the pipeline axis mapping, macro inspection, pipe wall thickness measurement and defect analysis, the selection of buried pipeline inspection, defect analysis, the research of phased array detection and defect analysis, spectral analysis, safety assessment and pipeline safety status grade comprehensive evaluation:

(1) In this paper, we study and verify the advantages and disadvantages of various conventional detection methods, to optimize the detection technology, and in the province took the lead to use the ultrasonic guided waves and phased array inspection technology and as a complement to conventional detection techniques, to effectively prevent the defects of missed and false detection.

(2) In this paper, the electric power industry in the province is the first to use the method of U factor and factor, the safety assessment and calculation of the standard defect pipeline, which is based on the regular inspection of industrial pipeline. The degree of damage is calculated.

Finally, after the evaluation of the field, the operation status of the pipeline is tracked and reviewed regularly, and the accuracy of the selected detection method and the calculation method is verified. It is also proved that the safety assessment results are safe and reliable. At the same time, the research on the formation of thermal power enterprises in the use of natural gas pipeline safety assessment of the process and methods for future development of thermal power enterprises in the use of pressure pipeline safety assessment or inspection work to provide reference and reference.

Key words: Thermal power generation; Natural gas pipeline; Safety assessment.

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